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Pre-audit  
G. Washington  
8/31/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: :  
Chen : Art Unit: 3672  
Serial No. 09/833,016 : Examiner: Hoang Dang  
Filed: 04/10/2001 : Atty's Docket: SC-98-25A  
For: Force-Balanced Roller-Cone Bits, Systems, Drilling Methods,  
and Design Methods

**PRELIMINARY AMENDMENT**

Honorable Commissioner of Patents and Trademarks  
Washington, DC 20231

Sir:

Prior to a first Office Action in this application, please enter the following amendments. As specified in the attached cover sheet, any extension of time necessary to prevent abandonment has been requested, and any fee necessary for consideration of this paper has been authorized to be charged to Deposit Account Number 07-2320.

**IN THE CLAIMS**

Please amend the claims to read as follows:

- 1 11. (AMENDED) A method of designing a roller cone drill bit, the  
2 steps of comprising:  
3 (a) calculating the force balance conditions of a bit;  
4 (b) defining design variables; *that affect bit balance condition?*  
5 (c) determine lower and upper bounds for the design variables;  
6 (d) defining objective functions mathematically as a function of said  
7 design variables;  
8 (e) defining constraint functions mathematically as a function of said  
9 design variables;  
10 (f) performing an optimization means; and, *what is being optimized?*  
11 (g) evaluating an optimized cutting structure by modeling.